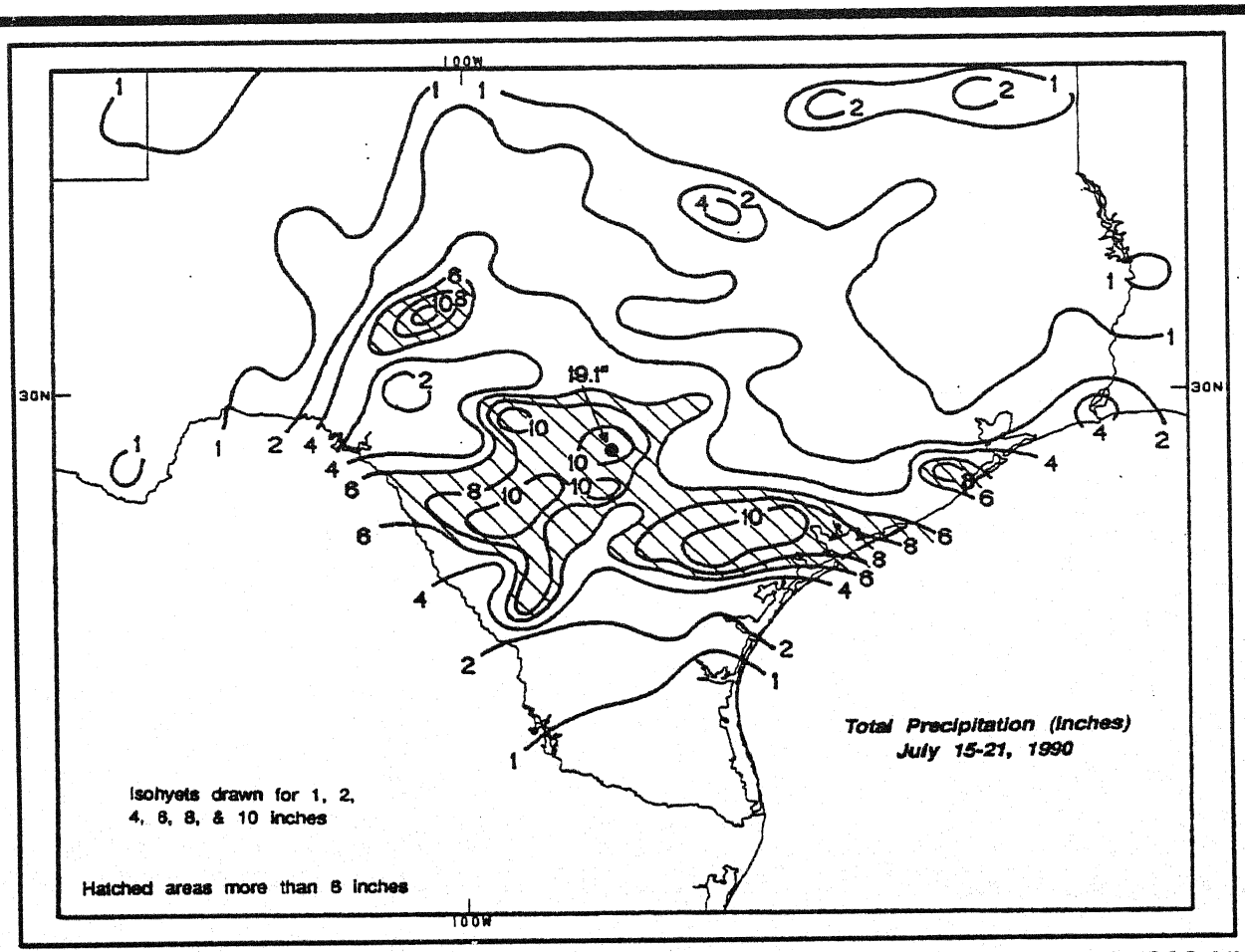
CLIMATE ANALYSIS CENTER

CONTAINS:
SOIL MOISTURE CONDITIONS IN THE MIDWEST

WEEKLY CLIMATE BULLETIN

No. 90/29 **Washington, DC** **July 21, 1990**



A STATIONARY FRONT TRIGGERED INTENSE AND SLOW-MOVING THUNDERSTORMS ACROSS MUCH OF SOUTH-CENTRAL TEXAS, DUMPING OVER 10 INCHES OF RAIN WITHIN 24 HOURS ON SEVERAL LOCATIONS, MOST NOTABLY DOWNTOWN SAN ANTONIO AND SOUTHERN PORTIONS OF THE CITY EARLY IN THE WEEK. MANY STATIONS MEASURED OVER A FOOT OF RAIN DURING THE WEEK, WITH THE LARGEST WEEKLY TOTAL EXCEEDING 19 INCHES. JUST PRIOR TO THE RAINS, SAN ANTONIO WAS PREPARING TO IMPLEMENT MANDATORY WATER RESTRICTIONS DUE TO DROUGHT.

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER

CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *U.S. cooling degree days (summer) or heating degree days (winter).*
- *Global two–week temperature anomalies.*
- *Global four–week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three–month precipitation anomalies (once a month).*
- *Global twelve–month precipitation anomalies (every three months).*
- *Global three–month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JULY 21, 1990

1. *Western North America*:

HOT AND DRY WEATHER PROMOTES FOREST FIRES.

After a week–long respite, hot weather returned to the region as temperatures averaged up to +7°C above normal across the northern tier of Alaska. Highs soared past 30°C in parts of interior Alaska and reached as high as 46°C in southern California. The dry, hot conditions promoted large wildfires across Alaska which have scorched more than 4100 square kilometers [Redeveloped – 4 weeks].

2. *High Plains*:

GENEROUS RAINFALL STOPS DRY SPELL.

Between 15 and 75 mm dampened most locations, especially across western Texas, bringing an end to the recent dry spell in most areas. Due to the scattered nature of the precipitation, however, pockets of dryness remained across Montana and isolated portions of the central and southern High Plains [Ended after 8 weeks].

3. *East–Central United States*:

COPIOUS RAINFALL AGAIN PLAGUES REGION.

Once again, heavy rains soaked a large portion of the central and eastern U.S., with most locations from central South Dakota eastward across the Corn Belt, Ohio Valley, lower Great Lakes, and mid–Atlantic recording 35 – 115 mm of rain. Several incidents of localized flash flooding were reported as localized excessive rainfall reached 180 mm in south–central Iowa and 215 mm in western Ohio [27 weeks].

4. *Central and Southern Texas*:

THREE DAYS OF EXCESSIVE RAINFALL BARRAGE REGION.

Slow–moving, heavy thunderstorms trekked across south–central Texas early in the week, dropping excessive amounts of rain across a large area surrounding San Antonio. Most locations reported 150 – 300 mm, with isolated amounts reaching 485 mm. Daily totals up to 270 mm deluged San Antonio and Beeville, with 48–hour amounts approaching 385 mm in Bloomington [Episodic Event].

5. *The Southern Atlantic Coast, Florida, and the Bahamas*:

SHOWERS BRING SOME RELIEF.

Between 15 and 40 mm fell throughout the region, engendering some relief from the recent dry spell. Heavy thunderstorms brought more significant rains to isolated parts of the southern Atlantic Coast and Florida, with amounts ranging from 50 mm to 135 mm [Ending after 15 weeks].

6. *East–Central South America*:

DRY WEATHER CONTINUES.

A storm system brought 30 – 60 mm to the northern fringes of th region, but most locations reported only 10 mm – 25 mm, promotin little or no relief from the dry spell [7 weeks].

7. *Southern Scandinavia*:

BRIEF WET SPELL ENDS.

Most locations recorded less than 25 mm of rain, bringing an end t short–lived moisture surpluses [Ended after 7 weeks].

8. *Western Europe*:

HEAT WAVE SPREADS ACROSS REGION.

Weekly temperatures averaged 3°C to 6°C above normal, with high reaching 41°C in portions of Spain and France [2 weeks].

9. *East–Central and Southern Europe*:

LIMITED RELIEF FOR SOUTHEASTERN EUROPE WHILE DRYNESS INTENSIFIES ACROSS FRANCE.

Portions of Bulgaria, Yugoslavia, and Greece measured 20 – 50 mm rain while 15 – 30 mm dampened central Italy, maintaining slightly decreasing moisture deficits. Most of France, howeve recorded little or no rainfall for the second consecutive week, stressi already deficient moisture supplies. Parts of southeastern Euro have six–week rainfall deficits exceeding 100 mm, and much of Fran has only received 15% – 50% of normal rainfall during the sam period [12 weeks].

10. *Northeastern Asia*:

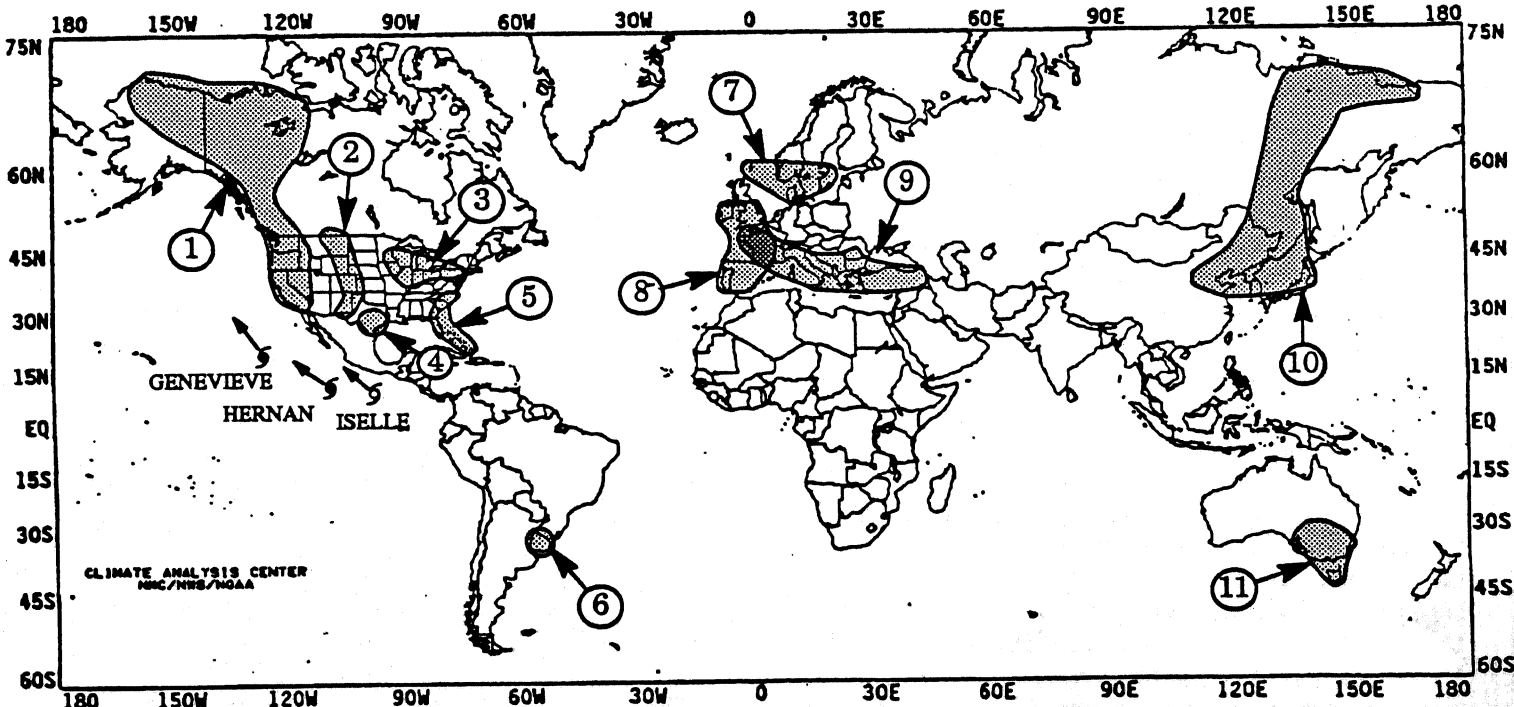
SCATTERED HEAVY RAINS PROLONG WET SPELL.

Heavy thunderstorms again drenched eastern China (except Inn Mongolia), the Koreas, northern Japan, Sakhalin, and much of easte Siberia. Up to 300 mm soaked east–central China while 100 – 2 mm deluged the southern two–thirds of the Koreas, especially ne the DMZ. In addition, 60 – 140 mm fell on northern Japan a isolated locations across northern Sakhalin and eastern Siber measured up to 145 mm [17 weeks].

11. *Southeastern Australia*:

UNSEASONABLY WET WEATHER DEVELOPS.

Since late May, unseasonably heavy precipitation has been report throughout southeastern Australia, including Tasmania. Although w weather has abated along the southeastern coast, most areas southern New South Wales, Victoria, and eastern South Austral recorded 20 – 50 mm last week, and have observed approximate twice the normal precipitation since mid–June [5 weeks].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long–term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JULY 15 – JULY 21, 1990

Numerous and widespread showers and thunderstorms brought another week of wet weather to much of the eastern two–thirds of the country. Particularly hard hit was south–central Texas, where up to 19 inches of rain, most of it falling during Sunday–Tuesday, produced flash flooding from Del Rio eastward to Galveston (front cover). Texas locations around San Antonio, Beeville, Eldorado, Victoria, Bloomington, and the La Pryor, Crystal City, and Carrizo Springs areas measured over a FOOT of rain during the week. Torrential downpours also generated flash flooding in parts of southern Arizona and Nevada, southeastern Nebraska, south–central Iowa, the West Virginia panhandle, and southwestern Pennsylvania. In sharp contrast, dry and unseasonably warm weather, with highs in the eighties, returned to the Alaskan interior, aiding more than 120 separate wildfires that have already burned over ONE MILLION acres since July 1. The two largest fires, Beaver Fire (174,000 acres) and Kanuti Fire (100,000 acres), were not being actively fought since they posed no threat to lives or property.

Early in the week, a cold front tracked southeastward into southern Texas and the western Gulf of Mexico and stalled. Behind the front, record and near–record low temperatures invaded much of the central and southern Great Plains and lower Mississippi Valley. Intense and slow–moving thunderstorms developed along the front, inundating much of south–central Texas and the western Gulf Coast with copious amounts of rain. San Antonio and Beeville, TX both received over 10 inches of rain within 24 hours. The northern section of the cold front also stalled over the Appalachians and eventually dissipated, generating scattered showers and thunderstorms throughout the Atlantic Seaboard. Farther west, monsoonal thundershowers in the Southwest produced localized flash flooding in parts of southern Nevada, Arizona, and southeastern California. Meanwhile, another cold front slowly pushed southeastward out of Canada into the north–central U.S.

A stagnant weather pattern dominated the lower 48 states during the latter half of the week. The cold front in the north–central U.S. eventually became stationary across the central Plains, middle Mississippi and northern Ohio Valleys, and western New England. Waves of low pressure developed along the front, triggering strong and sometimes severe thunderstorms throughout the aforementioned areas. High pressure over the southern Atlantic Ocean kept the Southeast seasonably warm and humid with occasional scattered afternoon thundershowers while hot and dry weather dominated the Far West, increasing the risk of wildfires. By the week's end, firefighters were battling scores of mostly lightning–caused small wildfires in parts of Montana, Oregon, Idaho, Washington, and Wyoming.

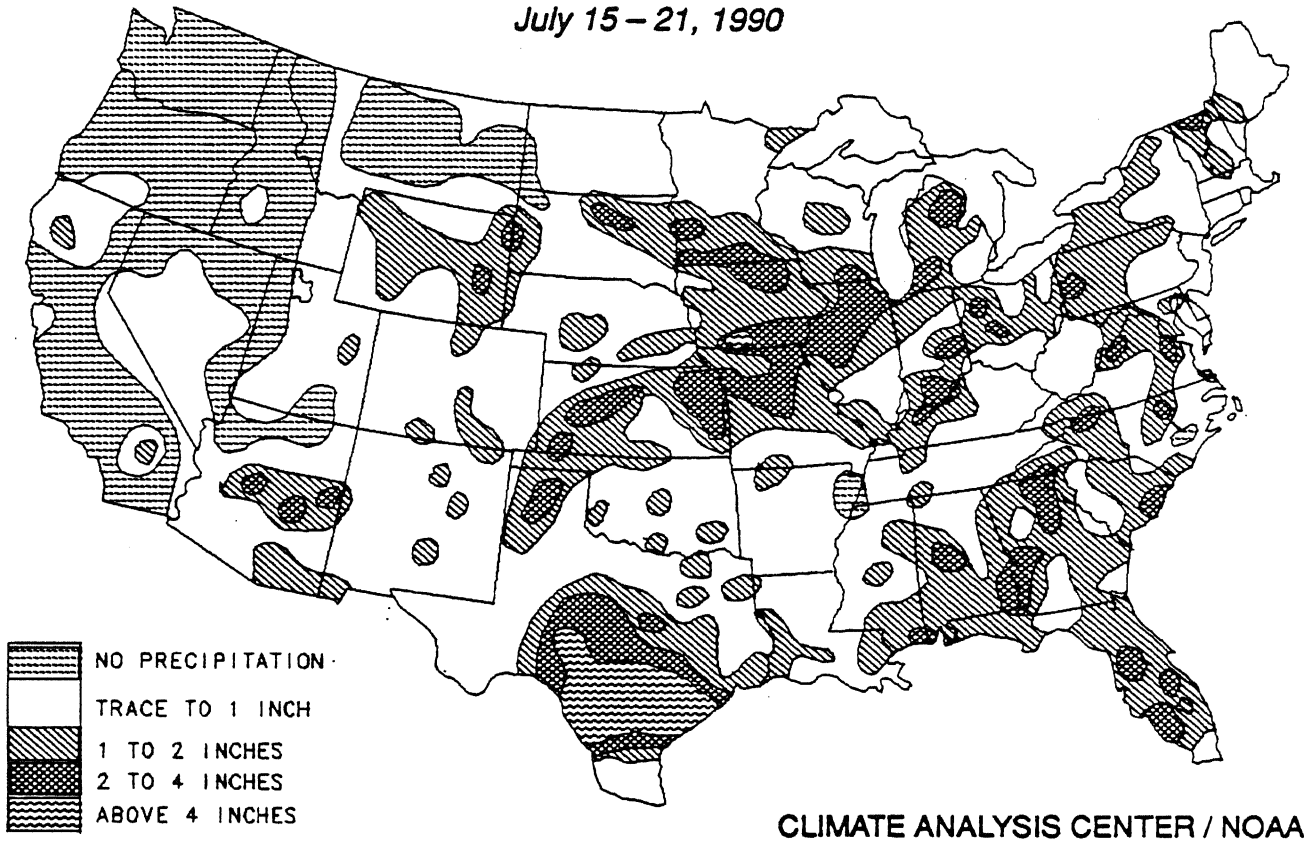
According to the River Forecast Centers, the greatest weekly amounts (more than 4 inches) occurred in south–central Texas (front cover) and at scattered stations in the western and central Corn Belt, central Great Plains, southern Appalachians, and southern Arizona (Table 1). Elsewhere, moderate to heavy totals fell on parts of the central and southern Rockies and High Plains, most of the central and southern Great Plains, throughout the Corn Belt, across most of the Appalachians, and on much of the Southeast. Light to moderate precipitation was recorded in the Great Basin, Arizona, and throughout most of the country east of the Rockies. Little or no rain was observed west of the Rockies with the exception of the Great Basin and Arizona, in portions of the lower Mississippi and Tennessee Valleys, and sections of southeastern New England.

For the second consecutive week, temperatures averaged well above normal in the Far West, with departures up to +7°F and triple–digit readings in the central valleys of California, Oregon, and Washington. The northeastern quarter of the U.S. also experienced unusually warm conditions as highs in the upper eighties and lower nineties were common in northern New England with weekly departures exceeding +8°F. Farther north, unseasonably warm weather returned to Alaska after a brief respite. Readings soared into the eighties at several interior Alaskan stations and temperatures averaged up to 14°F above normal (Table 2).

In contrast, cool Canadian air covered most of the central U.S. early and late in the week. Persistent cloudiness and heavy rains further lowered temperatures across most of the southern Great Plains as weekly departures approached –10°F in central Texas (Table 3). Early in the week, over a dozen stations in the central and southern U.S. set daily minimum temperature records with lows in the fifties and lower sixties. Temperatures dropped into the forties across the northern Plains and Rockies.

OBSERVED PRECIPITATION

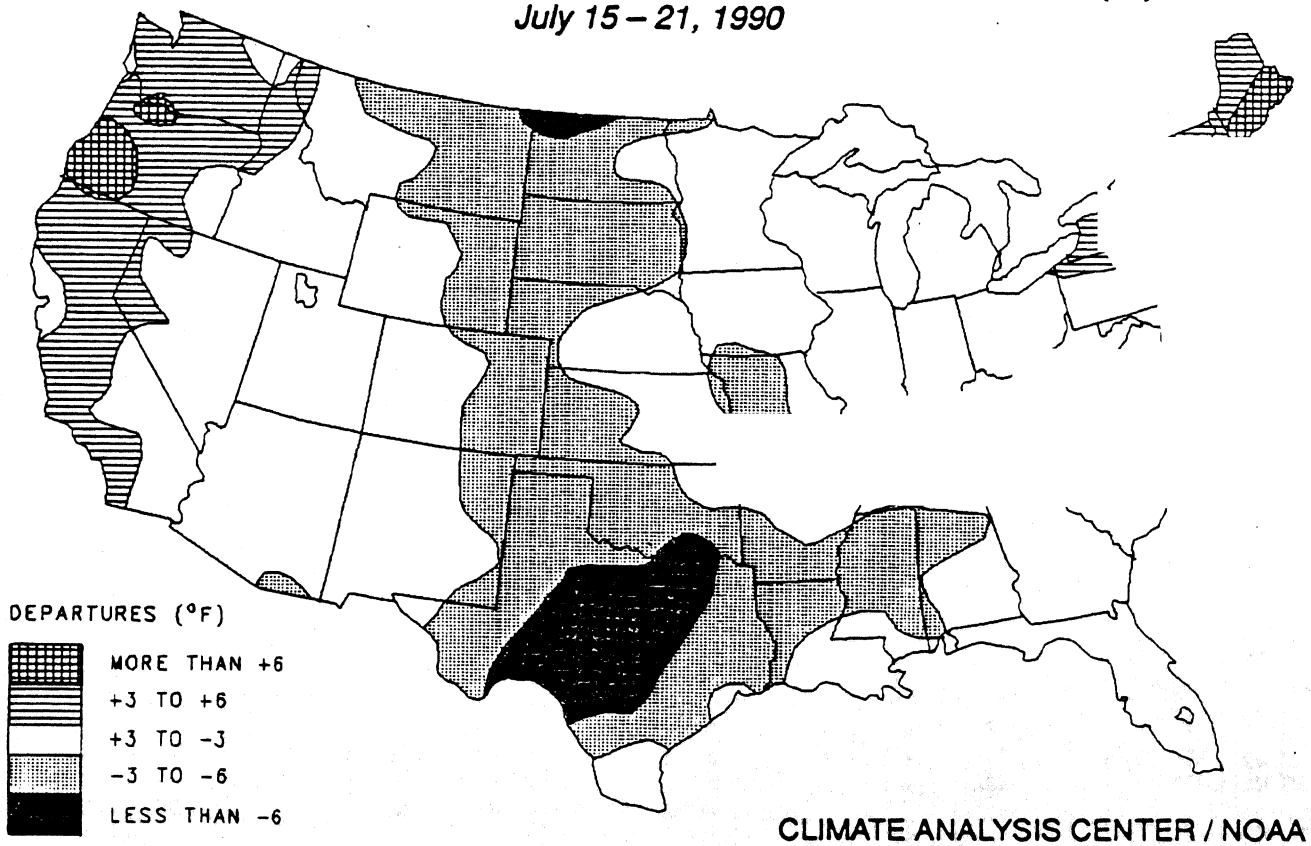
July 15 – 21, 1990



CLIMATE ANALYSIS CENTER / NOAA

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

July 15 – 21, 1990



CLIMATE ANALYSIS CENTER / NOAA

TABLE 1. Selected stations with 2.50 or more inches of precipitation for the week.

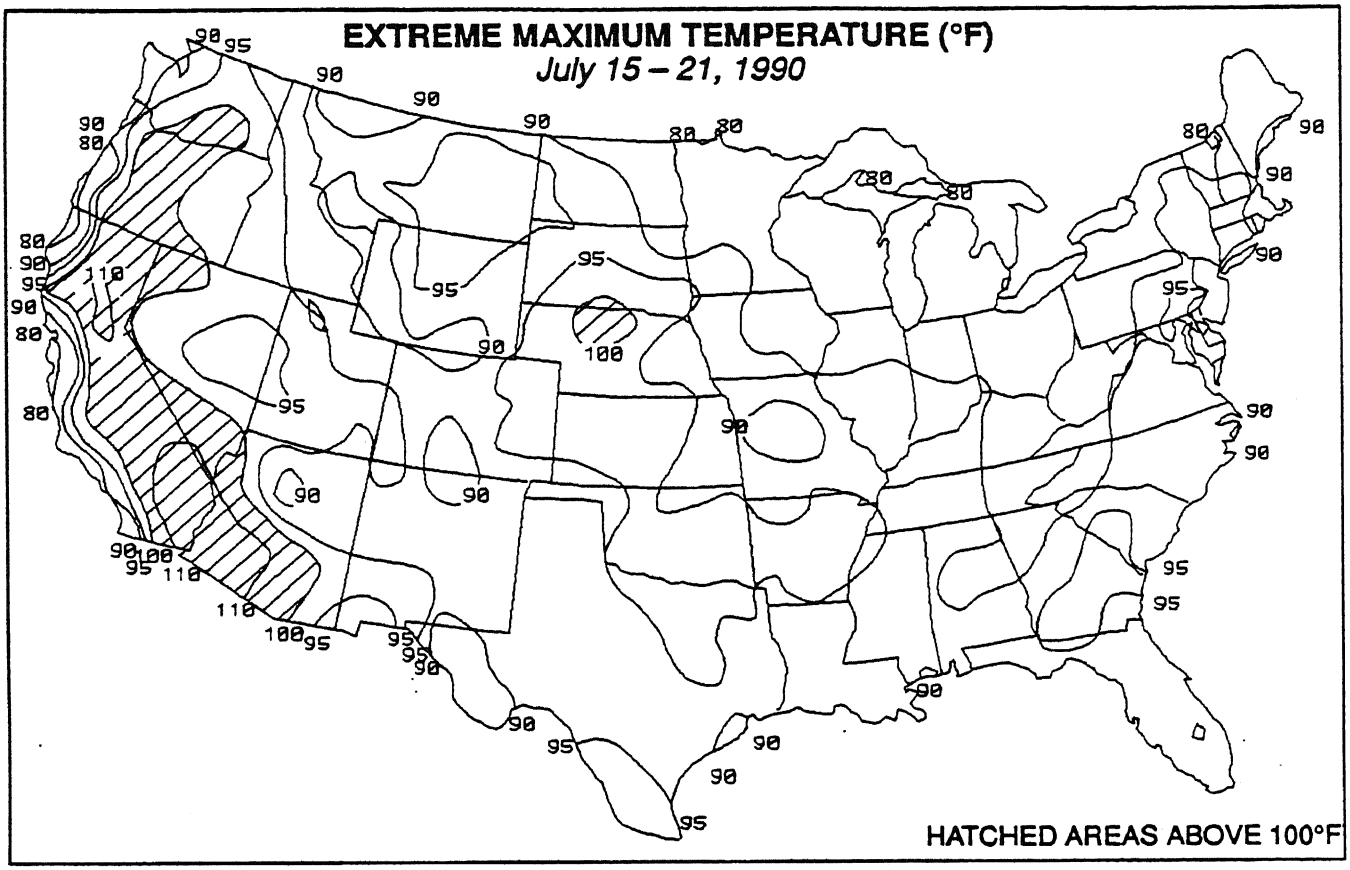
STATION	TOTAL (INCHES)	STATION	TOTAL (INCHES)
VICTORIA, TX	12.35	ATHENS, GA	3.35
BEEVILLE NAS, TX	12.14	MASON CITY, IA	3.24
SAN ANTONIO/KELLY AFB, TX	11.53	OTTUMWA, IA	3.04
SAN ANTONIO, TX	7.52	GALVESTON, TX	3.02
DEL RIO/LAUGHLIN AFB, TX	7.08	CENTERVILLE, GA	2.99
UNIVERSAL CITY/RANDOLPH AFB, TX	5.44	ABILENE/DYESS AFB, TX	2.97
PALACIOS, TX	5.15	ROCKFORD, IL	2.88
AUSTIN/BERGSTROM AFB, TX	4.02	SPRINGFIELD, IL	2.75
HILO/LYMAN, HAWAII, HI	3.95	DOTHAN, AL	2.71
SOUTH BEND, IN	3.53	PORT ARTHUR, TX	2.65
PEORIA, IL	3.53	DEL RIO, TX	2.60
ILIAMNA, AK	3.50	BURLINGTON, IA	2.58
TUCSON/DAVIS-MONTHAN AFB, AZ	3.49		

TABLE 2. Selected stations with temperatures averaging 5.5°F or more ABOVE normal for the week.

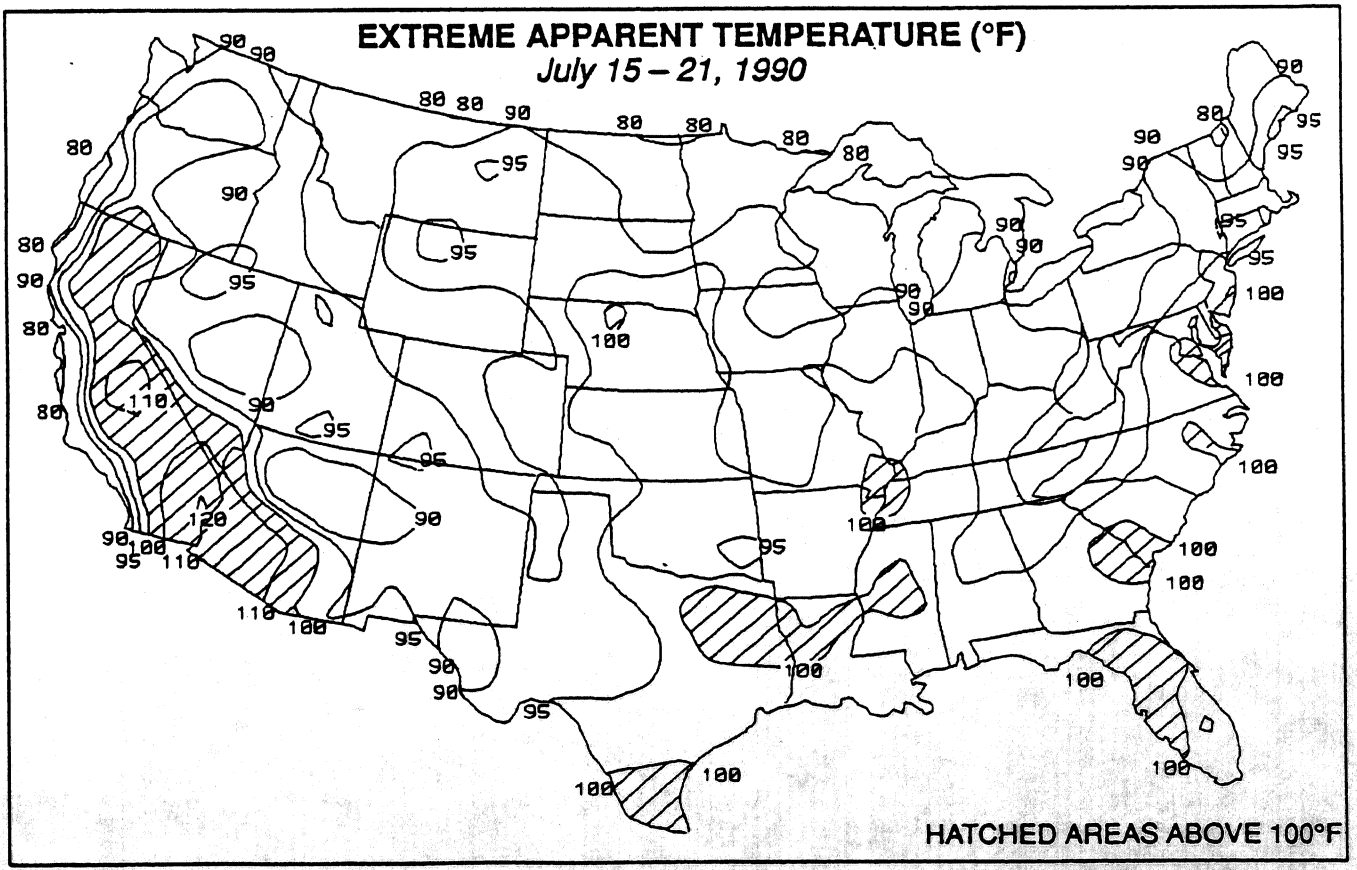
STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
BARTER ISLAND, AK	+14.3	54.6	BANGOR, ME	+6.1	74.5
EASTPORT, ME	+8.6	71.5	FRESNO, CA	+6.0	87.5
PORTLAND, ME	+7.8	76.4	CARIBOU, ME	+6.0	71.4
SEXTON SUMMIT, OR	+7.4	71.9	VICTORVILLE/GEORGE AFB, CA	+5.9	85.1
BARROW, AK	+7.4	46.8	NORTHWAY, AK	+5.9	64.7
MEDFORD, OR	+7.3	80.4	SEATTLE-TACOMA, WA	+5.8	71.0
AUGUSTA, ME	+6.6	76.4	SAN BERNARDINO/NORTON AFB,CA	+5.7	83.0
PORTLAND, OR	+6.6	74.6	PROVIDENCE, RI	+5.7	78.9
BOSTON/LOGAN, MA	+6.5	80.5	ISLIP, NY	+5.7	78.6
TALKEETNA, AK	+6.4	64.7	HARTFORD, CT	+5.6	79.4
EUGENE, OR	+6.3	73.7	RUMFORD, ME	+5.5	72.9
MCGRATH, AK	+6.3	64.8	SALEM, OR	+5.5	72.4
FAIRBANKS, AK	+6.2	67.9			

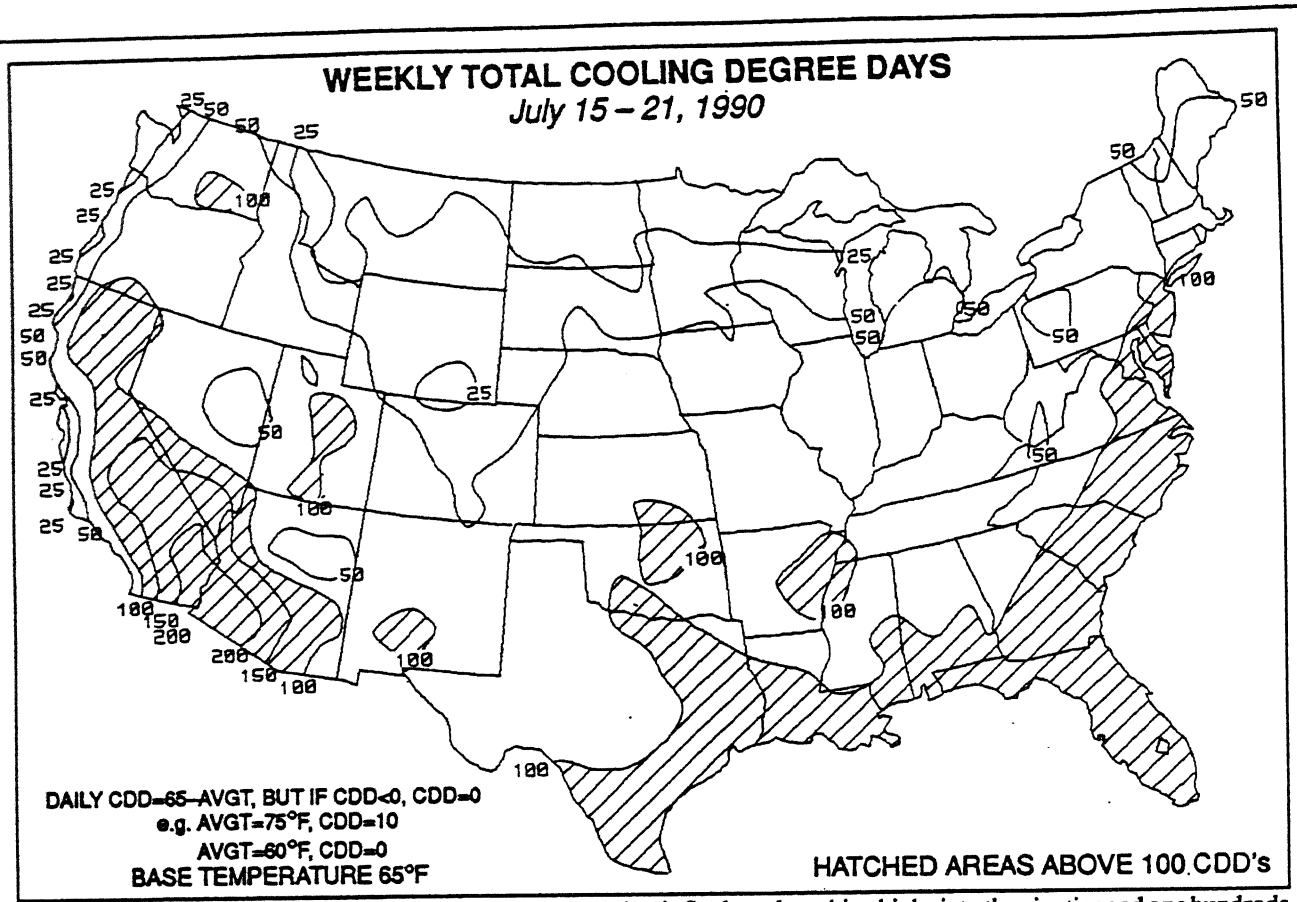
TABLE 3. Selected stations with temperatures averaging 5.0°F or more BELOW normal for the week.

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
ABILENE, TX	-9.6	74.7	ABERDEEN, SD	-5.5	67.1
SAN ANGELO, TX	-9.2	74.9	MIDLAND, TX	-5.5	76.3
DEL RIO, TX	-8.0	78.1	WILLISTON, ND	-5.4	65.4
SAN ANTONIO, TX	-7.4	77.3	COLLEGE STATION, TX	-5.4	79.0
DALLAS-FORT WORTH, TX	-7.3	78.7	LA JUNTA, CO	-5.3	74.2
AUSTIN, TX	-7.0	77.9	GAGE, OK	-5.3	76.6
WACO, TX	-6.4	79.7	TEXARKANA, AR	-5.3	77.9
DALLAS/LOVE FIELD, TX	-6.2	80.5	MINOT, ND	-5.2	64.7
AUSTIN/BERGSTROM AFB, TX	-6.1	78.8	HURON, SD	-5.1	69.3
MCALESTER, OK	-5.7	77.4	WINK, TX	-5.1	78.5
WICHITA FALLS, TX	-5.7	80.1			

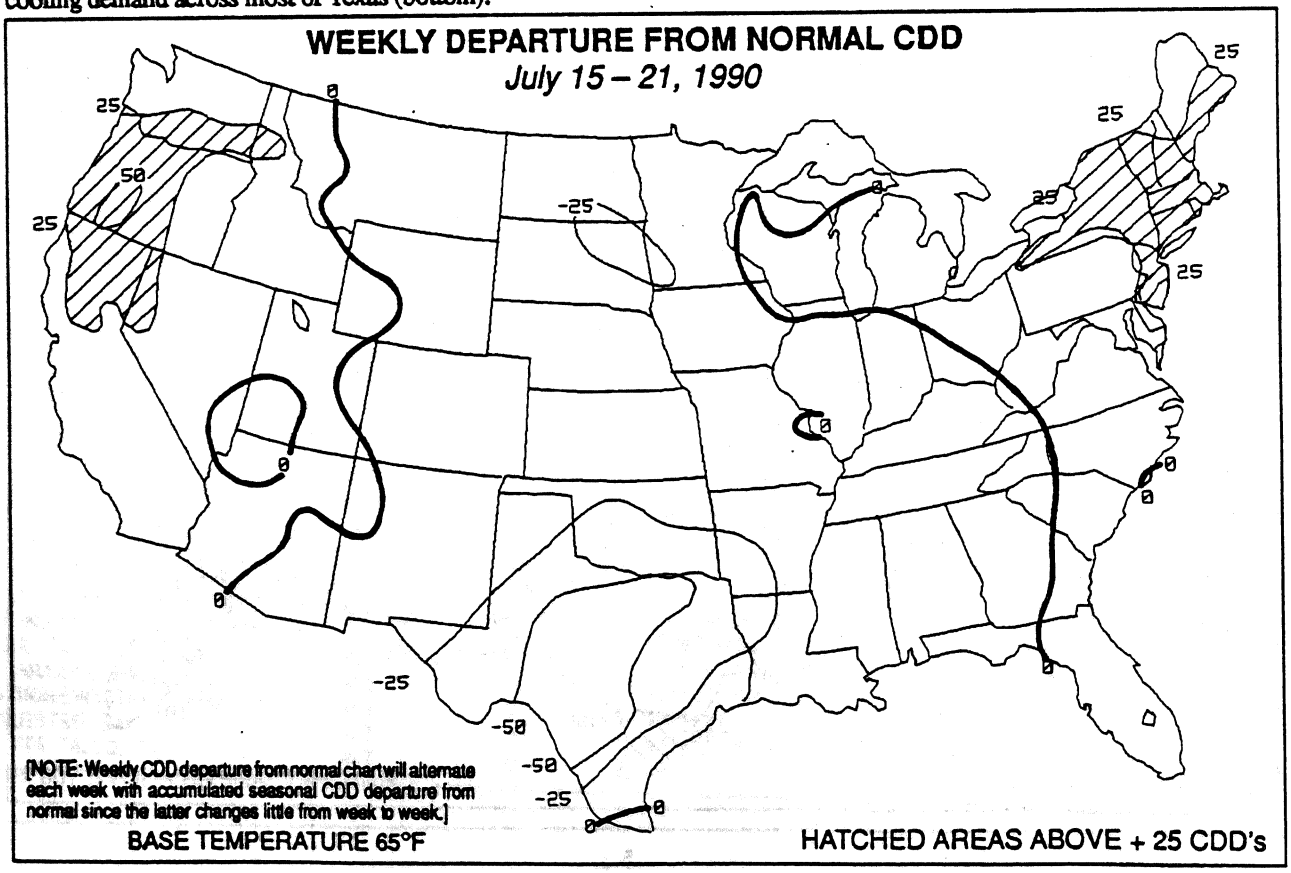


Hot weather dominated much of the western and eastern quarter of the country, with triple–digit readings in interior California, Oregon, and Washington and highs above 90°F in eastern New England (top). High humidities accompanied the heat in the Southeast and along the East Coast, producing apparent temperatures in the extreme caution to dangerous categories (bottom).



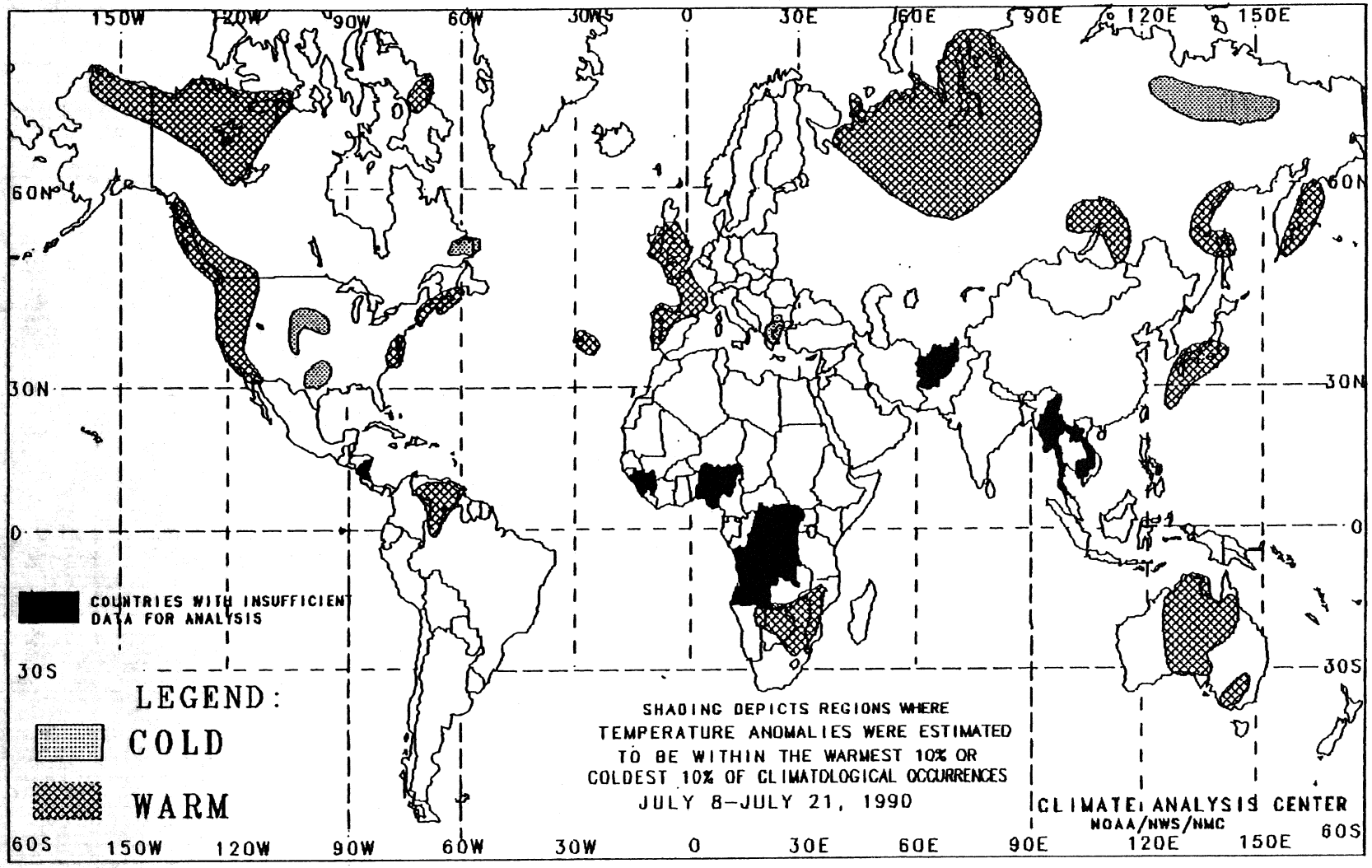


Unseasonably warm weather covered the Far West and the Atlantic Seaboard, pushing highs into the nineties and one hundreds and generating large (> 100 CDD's) air conditioning usage (top). Significant above normal cooling demand (> +25 CDD's) was recorded in the Pacific Northwest and New England while cooler air and heavy rains substantially reduced the usual cooling demand across most of Texas (bottom).



GLOBAL TEMPERATURE ANOMALIES

2 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty–four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

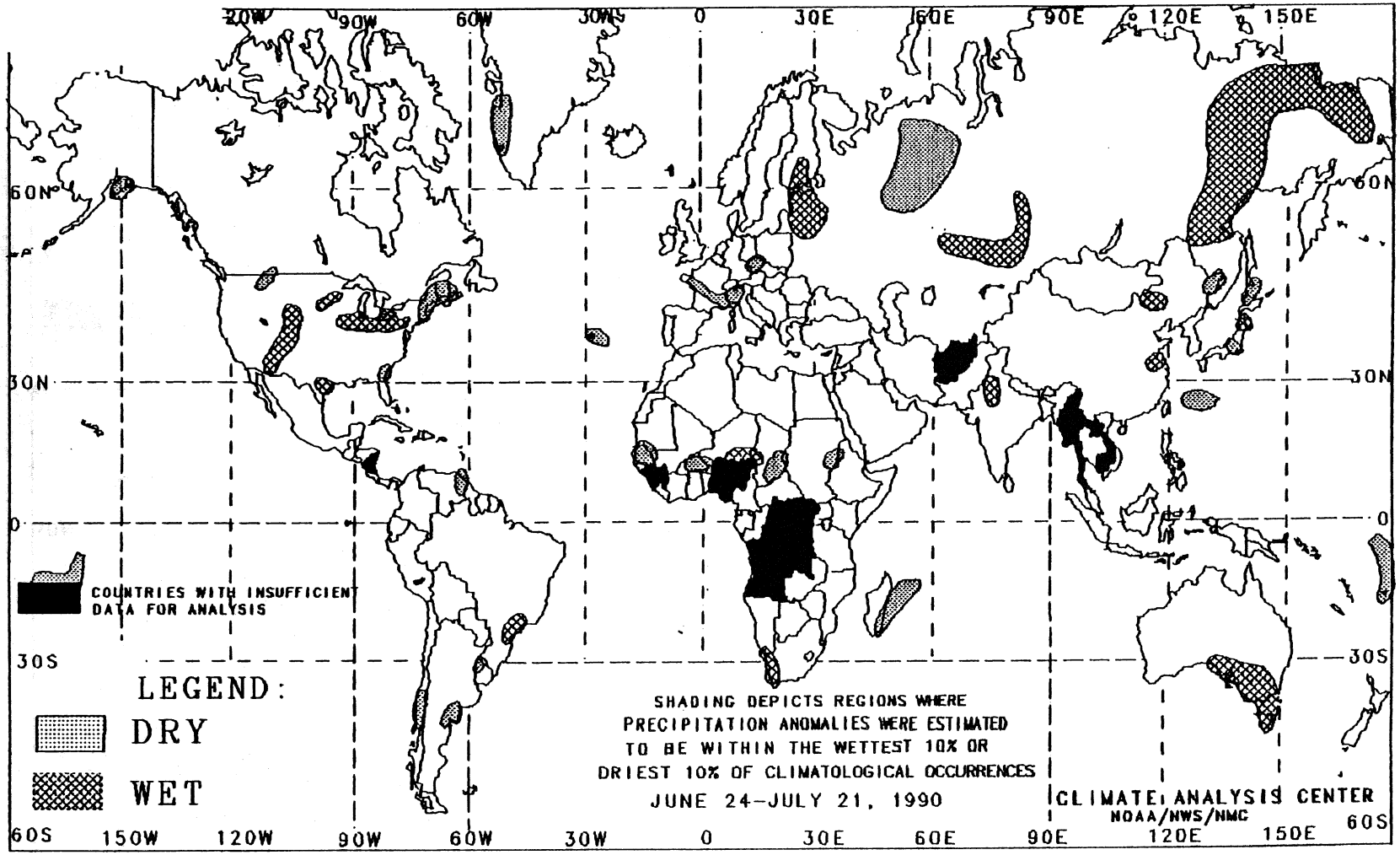
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

SPECIAL CLIMATE SUMMARY

SOIL MOISTURE CONDITIONS IN THE MIDWEST AS OF JULY 19, 1990

Midwest Regional Climate Center, Champaign, IL
Contact: Ken Kunkel Phone: (217) 244–1488

The Midwestern Corn Belt received frequent substantial rainfall through the first half of the 1990 growing season that resulted in problems such as planting delays and flooding. The rains, however, have been very beneficial for the supply of water to growing crops. The Midwestern Climate Center developed a computer model for estimating daily soil moisture conditions in the Midwest. The latest model (as of July 19) indicates that soil moisture conditions are very favorable through the heart of the Corn Belt. Figure 1 depicts the current soil moisture conditions expressed as departures from the long–term normal conditions for mid–July. The model indicates that soil moisture supplies in the top 6 feet of the soil are well above normal in much of Iowa, northern Illinois, northern Missouri, and northern Indiana. Much of the rest of the region is near normal. The only areas showing below normal conditions are northwestern Minnesota, southern Illinois, western Kentucky, and southeastern Missouri.

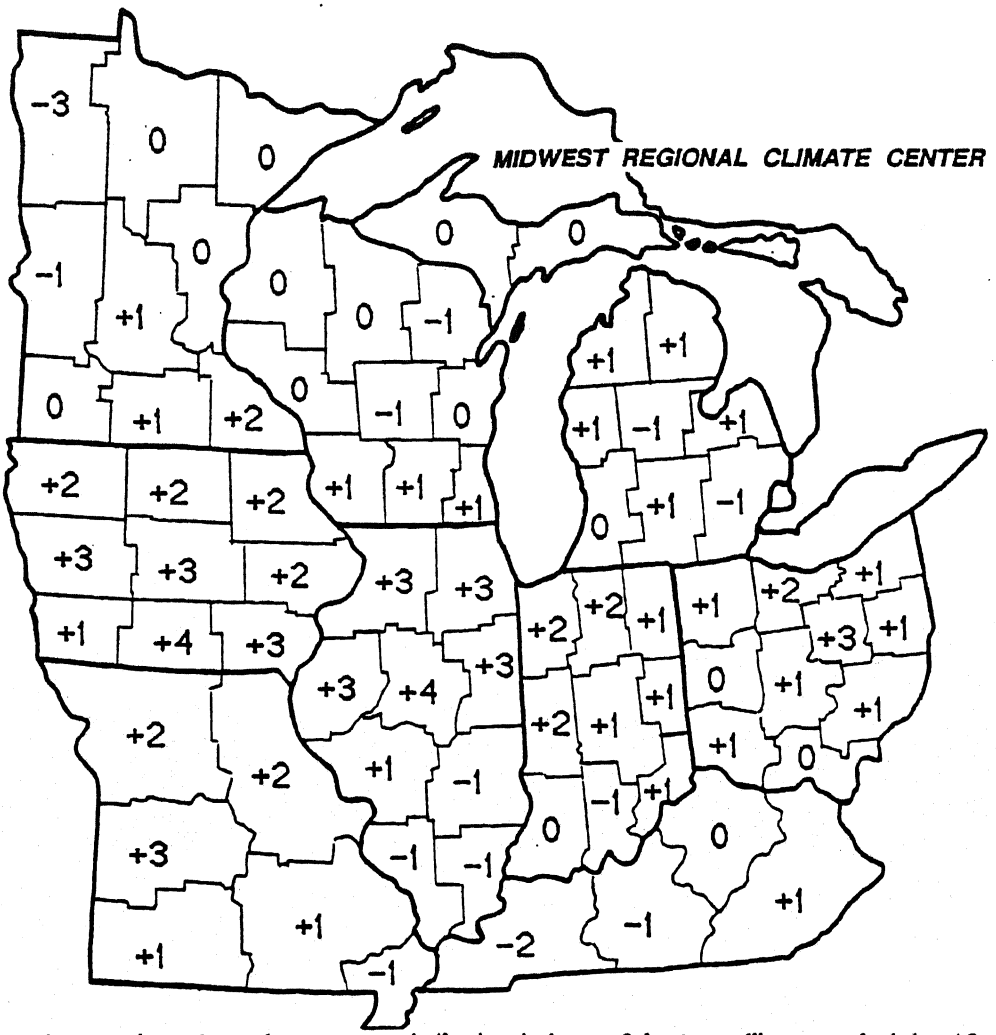


Figure 1. Soil moisture departure from normal (inches) in a 6-foot profile as of July 19, 1990, obtained from the Midwest Regional Climate Center. Values are state climate division averages calculated from a soil moisture model. Similar to the Palmer (Long-Term) Drought Severity Index, excessively wet conditions are common across most of Iowa, northern Missouri and Illinois, and parts of Indiana and Ohio. In sharp contrast, severe and extreme drought afflicted much of the western Corn Belt less than a year ago (see Figure 2).

Compared to a year ago, the current soil moisture conditions in the Midwest are nearly reversed (Figure). Areas that failed to receive significant relief a year after the Drought of 1988, such as Iowa, southern innesota, northern Missouri, northwestern Illinois, and southwestern Wisconsin, presently have surplus oil moisture. In contrast, excessively wet conditions in the lower Missouri and lower Ohio Valleys during July 989 have diminished to near or slightly below normal levels.

Areas of above average soil moisture conditions coincide, in general, with the areas of largest production of orn and soybeans. These favorable soil moisture conditions are present at a key time in the growing season as orn and soybeans enter their reproductive phase. The abundant soil moisture supplies create a cushion gainst possible dry periods during the rest of the growing season. Generally speaking, the mid–summer soil oisture situation is quite favorable for Midwestern agriculture.

The soil moisture model provides an assessment of overall regional conditions, and localized areas may ave experienced conditions different from those estimated by the model.

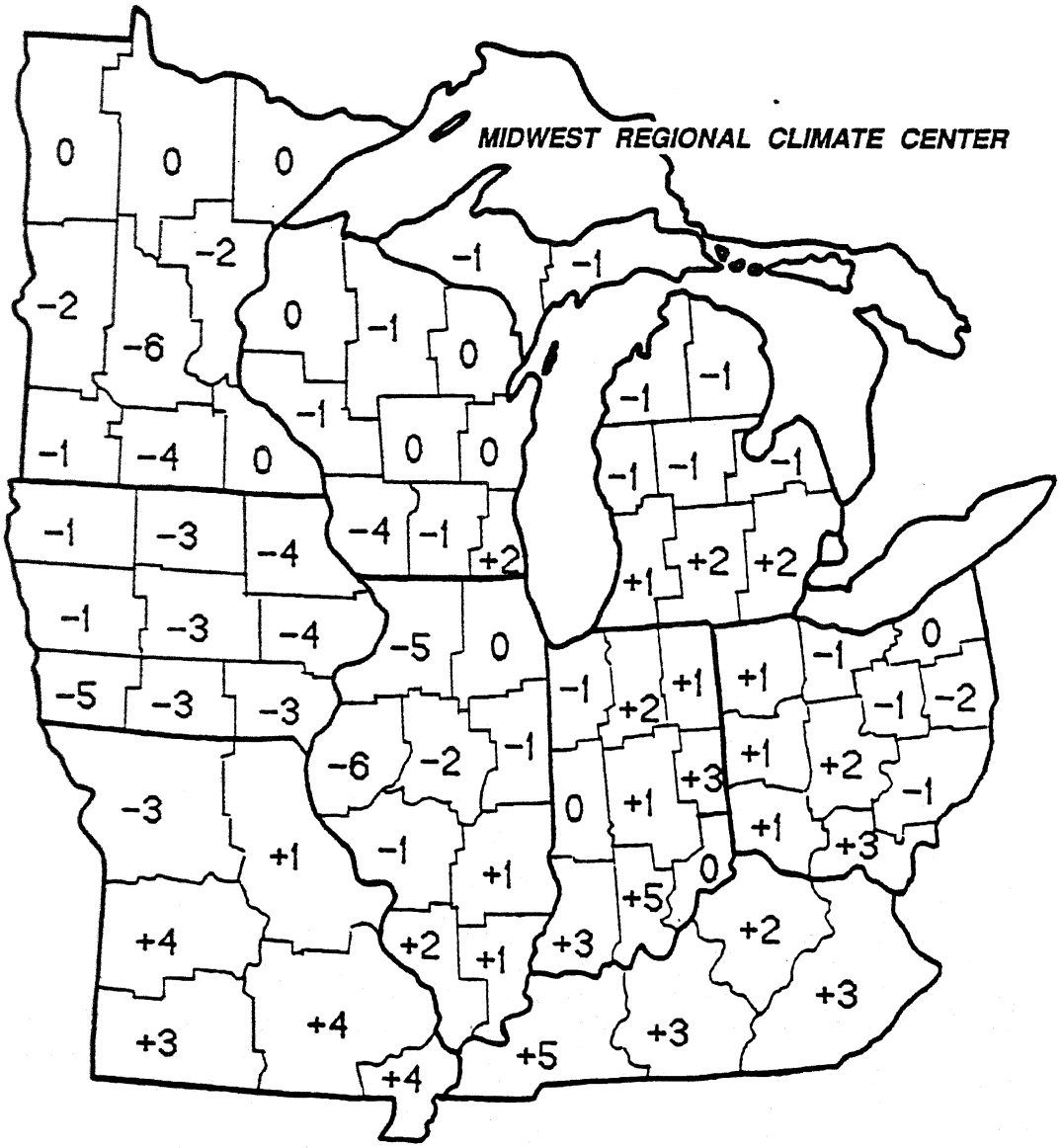
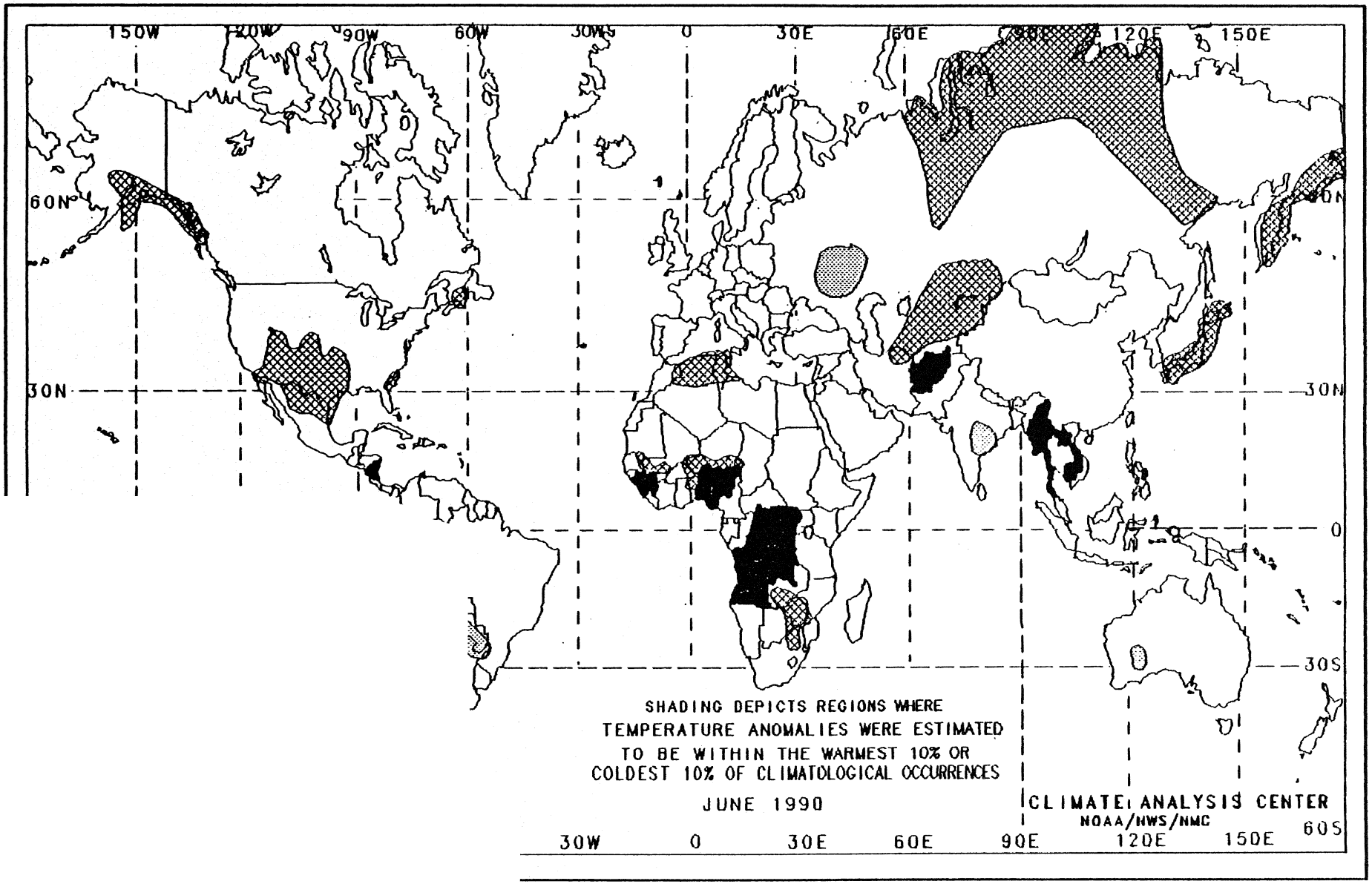


Figure 2. Soil moisture departure from normal (inches) in a 6-foot profile as of July 24, 1989, obtained from the Midwest Regional Climate Center. Values are state climate division averages calculated from a soil moisture model. Most of the western Corn Belt continued to experience large subsoil moisture deficits last July as August 1988-June 1989 precipitation was inadequate to alleviate shortages accumulated during the Drought of 1988. By July 1990, however, conditions were completely different (compare with Figure 1).

GLOBAL TEMPERATURE ANOMALIES

JUNE 1990



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The chart shows general areas of one month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

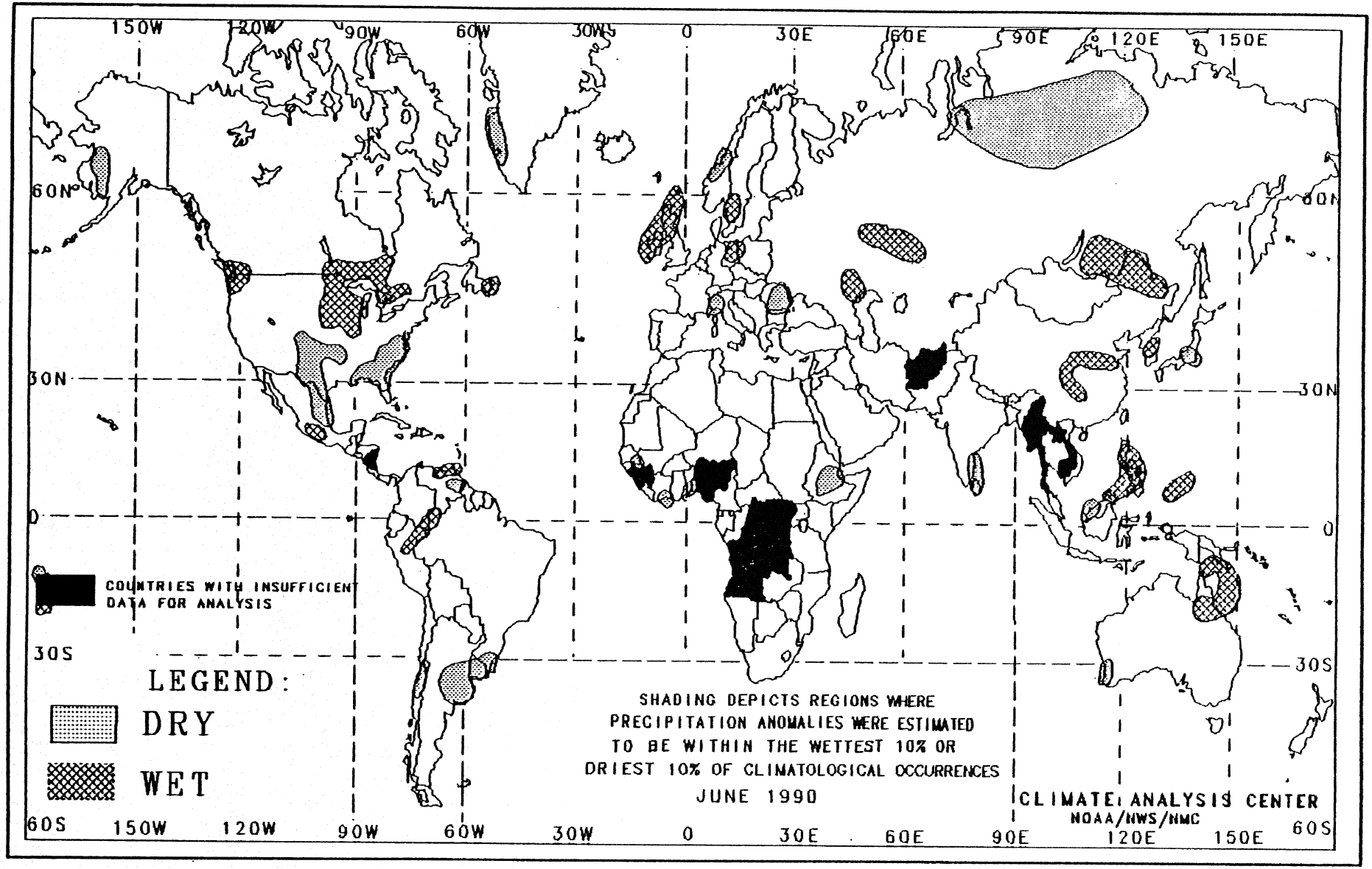
PRINCIPAL TEMPERATURE ANOMALIES

JUNE 1990

REGIONS AFFECTED	TEMPERATURE AVERAGE (°C)	DEPARTURE FROM NORMAL (°C)	COMMENTS
NORTH AMERICA			
Southeastern Alaska	+11 to +15	+2 to +3	Very warm first half of June
Nova Scotia	+14 to +16	Around +2	Very warm first half of June
Southwestern United States and Northeastern Mexico	+21 to +34	+2 to +4	WARM – 4 to 14 weeks
Georgia and South Carolina	+27 to +28	Around +2	Very warm early and late in June
SOUTH AMERICA AND EASTERN PACIFIC			
Paraguay and Northern Argentina	+13 to +16	–2 to –4	COLD – 2 to 4 weeks
Southern Chile and Southern Argentina	+3 to +9	+2 to +3	MILD – 4 to 8 weeks
EUROPE AND THE MIDDLE EAST			
Ukrainian S. S. R.	+14 to +16	–2 to –4	COLD – 4 to 10 weeks
AFRICA			
Morocco, Algeria, Tunisia, and Libya	+23 to +32	+2 to +3	WARM – 2 to 8 weeks
Senegal and Mali	+30 to +35	Around +2	Very warm first half of June
Burkina Faso, Togo, Benin, and Niger	+28 to +33	Around +2	WARM – 2 to 4 weeks
Zambia, Zimbabwe, and South Africa	+12 to +20	+2 to +3	WARM – 4 weeks
ASIA			
Northern and Central Siberia	+10 to +19	+2 to +5	WARM – 4 to 37 weeks
Kazakh S. S. R.	+22 to +31	+2 to +3	WARM – 4 to 7 weeks
South Central Siberia	+14 to +19	–2 to –4	Very cold early in June
Kamchatka Peninsula	+8 to +11	+2 to +3	Very warm second half of June
Japan	+12 to +25	+2 to +3	WARM – 2 to 6 weeks
India	+27 to +29	–2 to –3	COOL – 4 to 5 weeks
AUSTRALIA AND WESTERN PACIFIC			
Southwestern Australia	+10 to +12	Around –2	Very cold second half of June

GLOBAL PRECIPITATION ANOMALIES

JUNE 1990



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the one month period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total one month precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of one month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

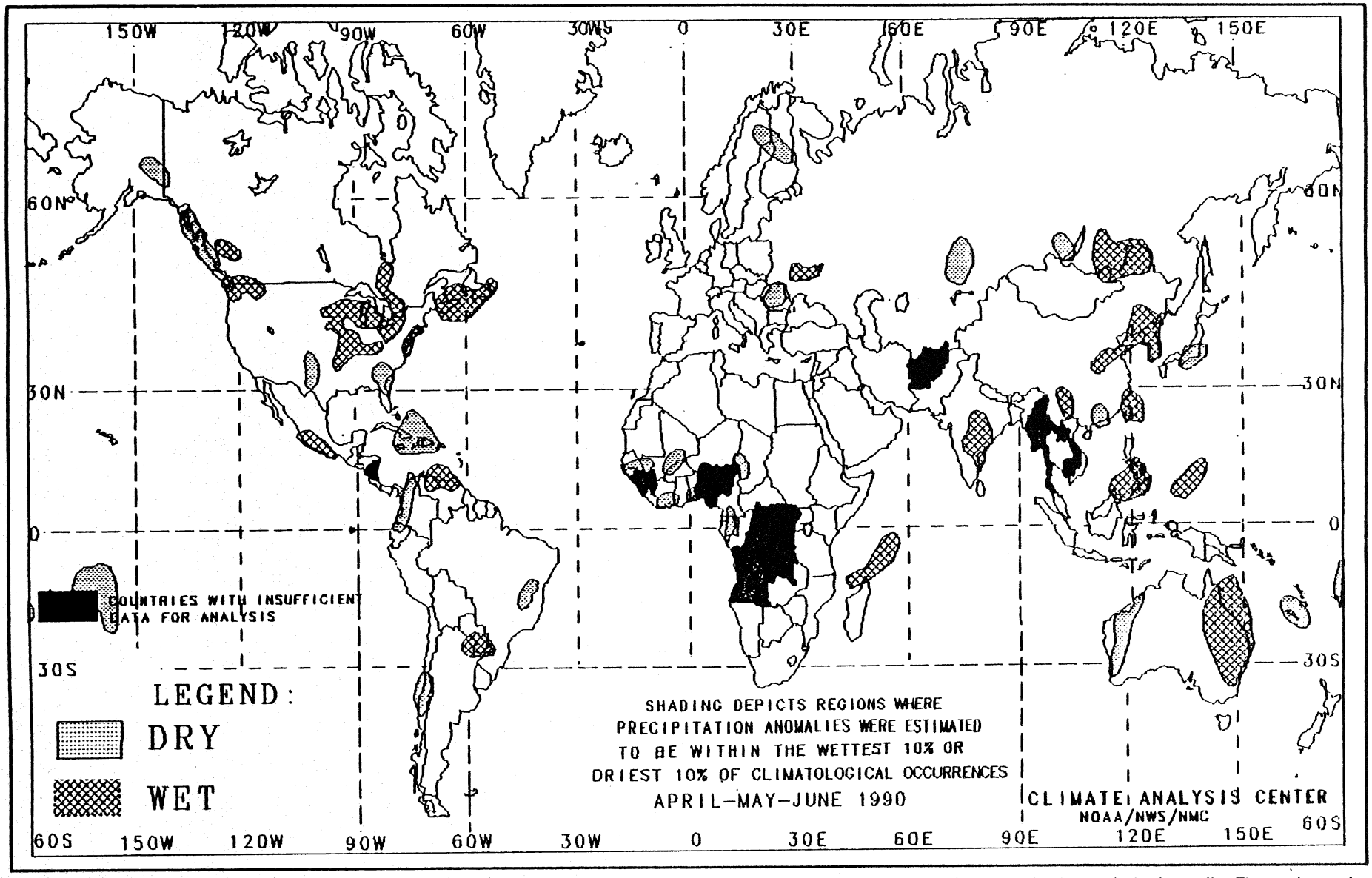
PRINCIPAL PRECIPITATION ANOMALIES

JUNE 1990

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
NORTH AMERICA			
West Central Alaska	Around 0	Around 0	DRY – 4 weeks
Northwestern United States and Southwestern Canada	73 to 131	185 to 275	Heavy precipitation first half of June
North Central United States and South Central Canada	112 to 267	158 to 262	WET – 2 to 6 weeks
Southeastern Newfoundland	138 to 148	163 to 173	WET – 4 to 8 weeks
Southeastern United States	0 to 44	0 to 44	DRY – 5 to 9 weeks
South Central United States and Northeastern Mexico	0 to 27	0 to 27	DRY – 5 to 10 weeks
Central Mexico	287 to 313	196 to 212	WET – 4 to 5 weeks
SOUTH AMERICA AND EASTERN PACIFIC			
Northern Tonga	30 to 68	24 to 38	DRY – 6 to 8 weeks
Southern Tonga	227 to 232	220 to 310	WET – 6 to 10 weeks
North Central Venezuela	186 to 240	159 to 235	WET – 4 to 5 weeks
Eastern Venezuela	63 to 122	39 to 61	DRY – 4 to 5 weeks
Northeastern Peru and Northwestern Brazil	138 to 457	162 to 192	Heavy precipitation first half of June
Central Chile	0 to 104	0 to 45	DRY – 14 weeks
Uruguay and Adjacent Parts of Argentina and Brazil	0 to 20	0 to 19	DRY – 4 to 10 weeks
EUROPE AND THE MIDDLE EAST			
Greenland	1 to 10	3 to 16	DRY – 5 to 8 weeks
Ireland and Scotland	91 to 151	156 to 214	Heavy precipitation early and late in June
Central Norway	17 to 43	30 to 45	DRY – 5 weeks
Southern Sweden	90 to 113	167 to 244	Heavy precipitation second half of June
Eastern East Germany and Western Poland	99 to 167	176 to 268	WET – 4 to 6 weeks
Northwestern Italy and Southeastern France	7 to 36	20 to 41	DRY – 5 to 16 weeks
Romania	21 to 52	26 to 52	DRY – 4 to 35 weeks
Ukrainian S.S.R.	55 to 121	263 to 382	Heavy precipitation second half of June
East Central European Soviet Union	93 to 128	209 to 251	Heavy precipitation second half of June
AFRICA			
Senegal and Mali	52 to 92	32 to 50	DRY – 10 to 12 weeks
Ivory Coast	250 to 275	40 to 47	DRY – 8 to 10 weeks
Togo and Benin	61 to 180	35 to 50	DRY – 5 to 10 weeks
Ethiopia	1 to 57	12 to 49	DRY – 4 weeks
ASIA			
Northern Siberia	8 to 21	20 to 42	DRY – 5 to 10 weeks
South Central Siberia and Northeastern China	90 to 147	186 to 259	WET – 2 to 10 weeks
Central China	147 to 311	170 to 268	WET – 2 to 10 weeks
Korea	358 to 377	309 to 319	Heavy precipitation second half of June
Sri Lanka and Southeastern India	1 to 14	1 to 23	DRY – 5 weeks
Japan	36 to 68	22 to 38	DRY – 7 to 10 weeks
AUSTRALIA AND WESTERN PACIFIC			
Philippines and Northern Borneo	219 to 754	151 to 230	WET – 4 to 5 weeks
Western Borneo	115 to 124	44 to 57	DRY – 4 to 7 weeks
Koror and Yap	608 to 859	210 to 230	WET – 4 weeks
Northeastern Australia	53 to 185	160 to 1082	Heavy precipitation first half of June
Southwestern Australia	76 to 111	43 to 61	DRY – 5 weeks

GLOBAL PRECIPITATION ANOMALIES

APRIL 1990 – JUNE 1990

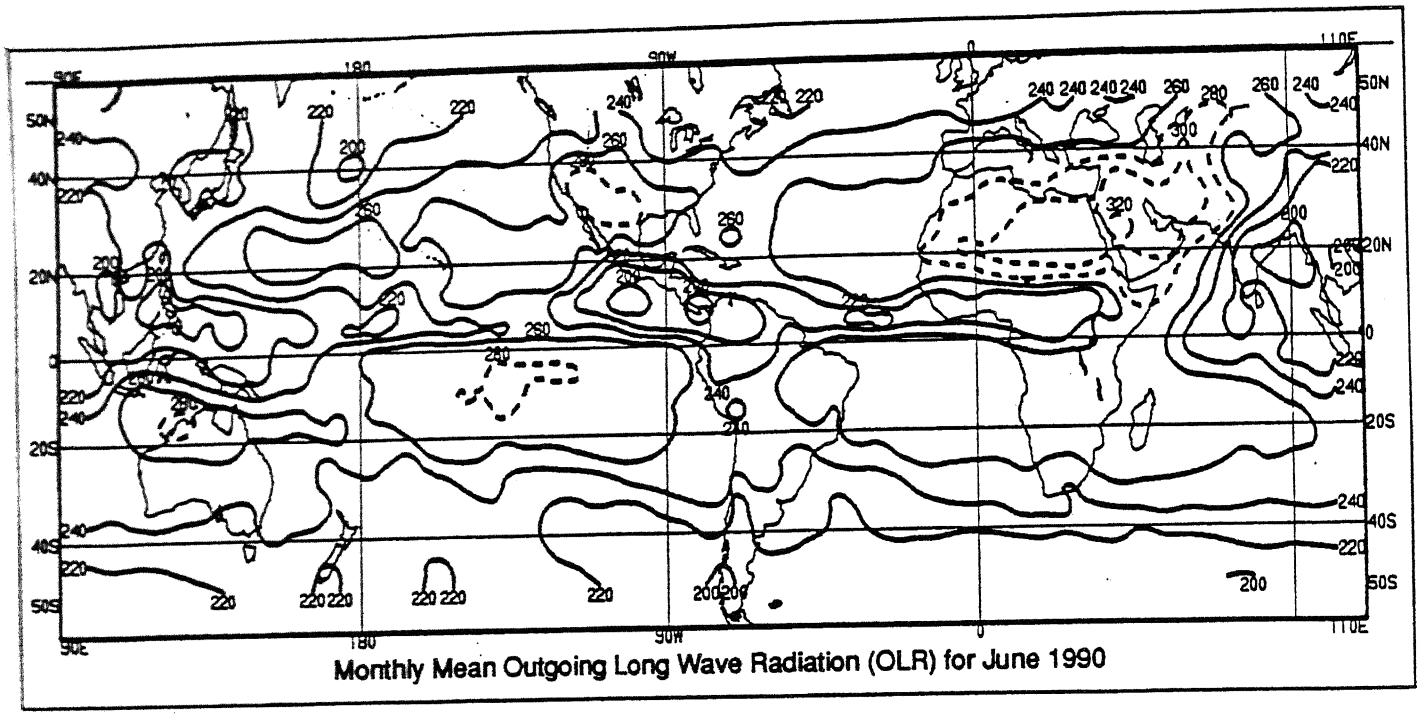


The anomalies on this chart are based on approximately 2500 observing stations for which at least 81 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the three month period is less than 50 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of three month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

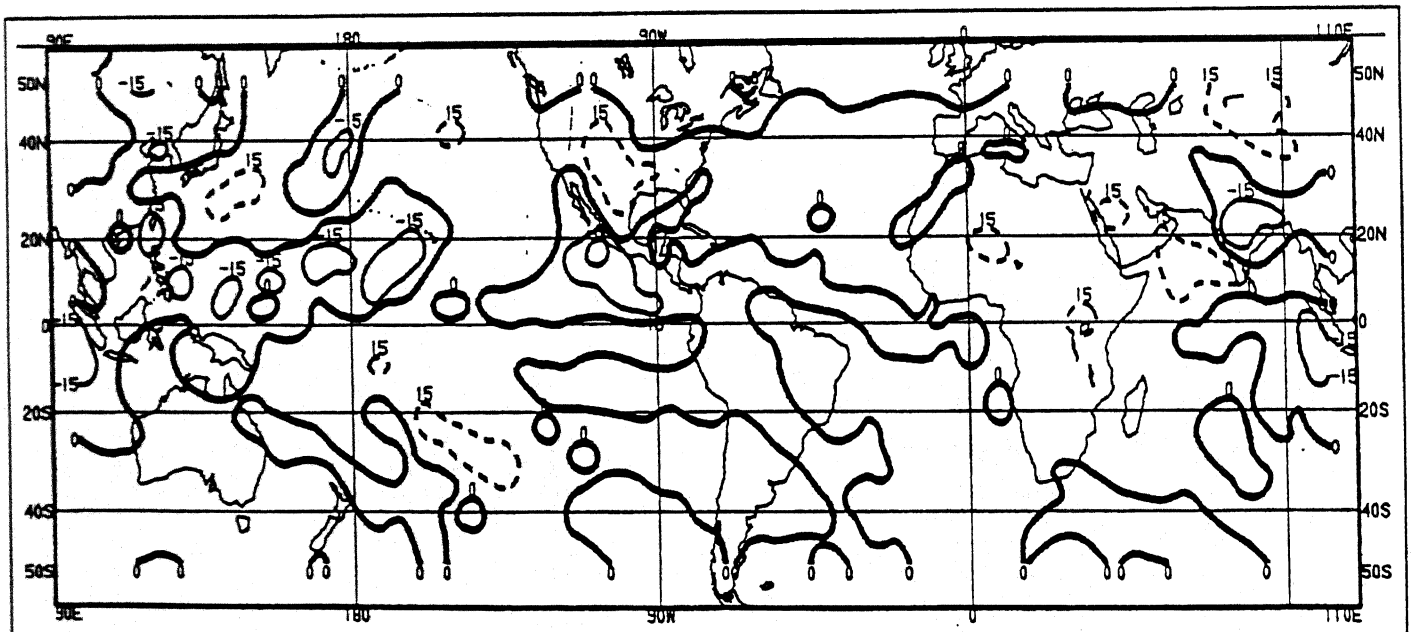


Monthly Mean Outgoing Long Wave Radiation (OLR) for June 1990

EXPLANATION

The mean monthly outgoing long wave radiation (OLR) as measured by the NOAA–9 AVHRR IR window channel by NESDIS/SRL (top). Data are accumulated and averaged over 2.5° areas to a 5° Mercator grid for display. Contour intervals are 20 Wm^{-2}, and contours of 280 Wm^{-2} and above are dashed. In tropical areas (for our purposes 20°N – 20°S) that receive primarily convective rainfall, a mean OLR value of less than 200 Wm^{-2} is associated with significant monthly precipitation, whereas a value greater than 260 Wm^{-2} normally indicates little or no precipitation. Care must be used in interpreting this chart at higher latitudes, where much of the precipitation is non–convective, or in some tropical coastal or island locations, where precipitation is primarily orographically induced. The approximate relationship between mean OLR and precipitation amount does not necessarily hold in such locations.

The mean monthly outgoing long wave radiation anomalies (bottom) are computed as departures from the 1979 – 1988 base period mean. Contour intervals are 15 Wm^{-2}, while positive anomalies (greater than normal OLR, suggesting less than normal cloud cover and/or precipitation) are dashed and negative anomalies (less than normal OLR, suggesting greater than normal cloud cover and/or precipitation) are solid.



Monthly Mean Outgoing Long Wave Radiation (OLR) Anomaly for June 1990